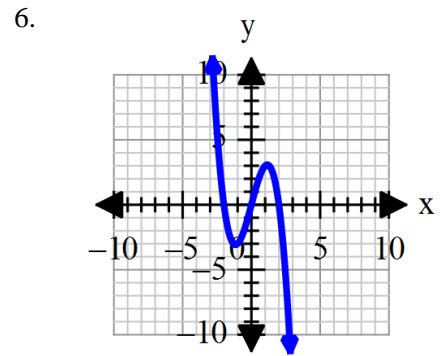
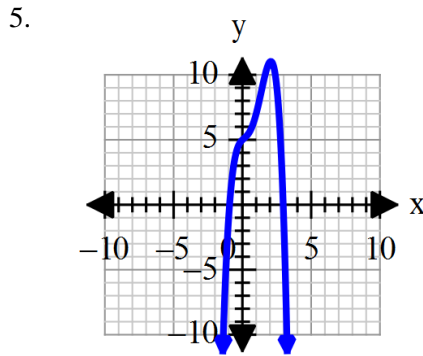
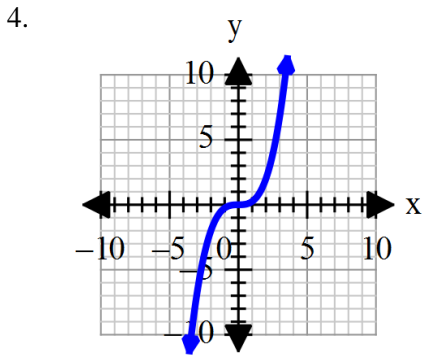
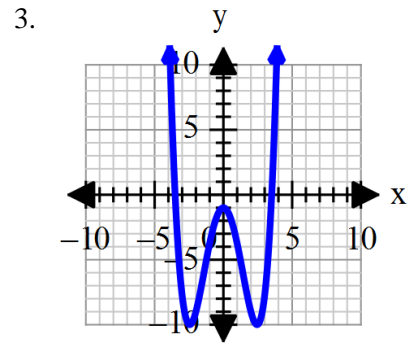
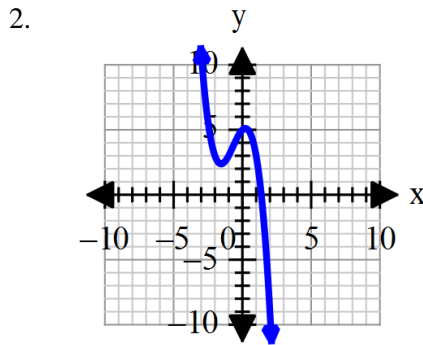
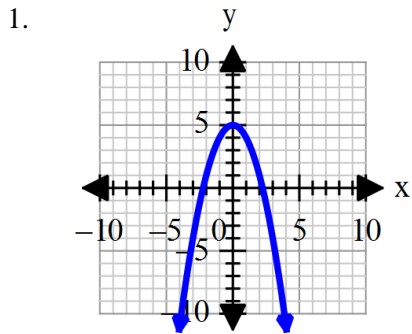


## 4.2 Transformations

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

Determine the symmetry of each of the following functions (even, odd, or neither).



Determine the symmetry of each of the following functions even, odd, or neither (using transformations).

7.  $f(x) = (x-2)^2$

8.  $f(x) = \frac{1}{5}(x-2)^2 + 9$

9.  $f(x) = x$

10.  $f(x) = \sqrt{x-3}$

11.  $f(x) = \frac{1}{3}|x| + 1$

12.  $f(x) = 3\sqrt[3]{x} + 5$

13.  $f(x) = \frac{1}{2}x^2 + 1$

14.  $f(x) = -3x^3$

15.  $f(x) = -x^3 + 1$

16.  $f(x) = 4x$

**Determine whether each function is even, odd or neither (algebraically). Show work!**

17.  $f(x) = -3x^4$

18.  $f(x) = 2x^3$

19.  $f(x) = 6x^3 - x^2$

20.  $f(x) = \sqrt{x^2 + 1}$

**Describe how the graph of the given function can be transformed into the equations for a-c.**

21.  $f(x) = x^2$

22.  $f(x) = |x|$

a)  $y = -x^2$

a)  $y = -3|x| + 4$

b)  $y = \frac{1}{2}x^2$

b)  $y = |x - 7| + 2$

c)  $y = x^2 + 5$

c)  $y = \frac{1}{4}|x + 1|$

23.  $f(x) = \sqrt{x}$

24.  $f(x) = \cos x$

a)  $y = \sqrt{x + 5} - 1$

a)  $y = -2\cos x$

b)  $y = \sqrt{2x} + 7$

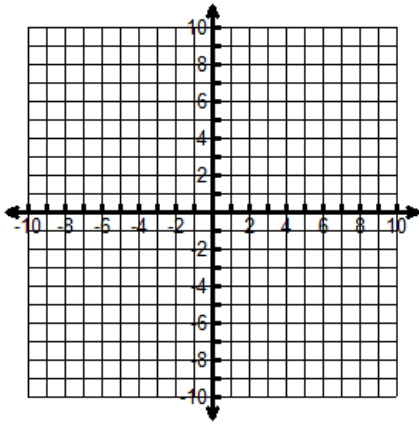
b)  $y = \cos\left(\frac{1}{3}x\right)$

c)  $y = \frac{1}{3}\sqrt{x - 1}$

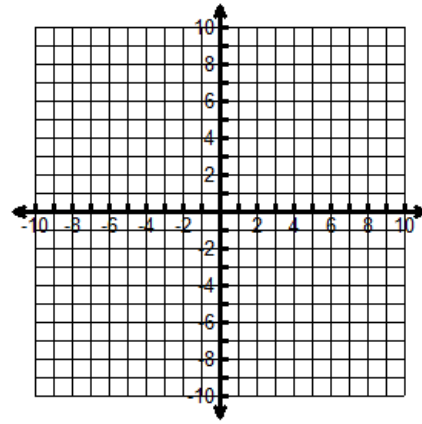
c)  $y = \cos x + 2$

Sketch the graphs of each function by hand. (Make a table if necessary.)

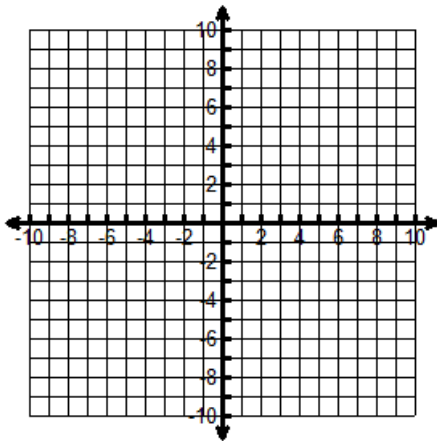
25.  $f(x) = \sqrt[3]{x+2}$



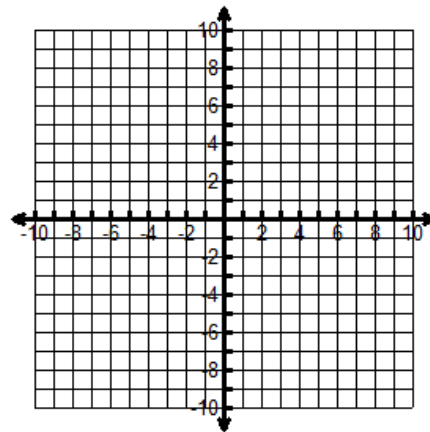
26.  $f(x) = 2\sqrt[3]{x} - 3$



27.  $f(x) = -\sqrt[3]{x-2}$



28.  $f(x) = -2|x-1| + 2$



Find the equation of the reflection of  $f$  across the a) x-axis and b) the y-axis.

29.  $f(x) = x^3 - 2x^2 - 3x + 5$

30.  $f(x) = 3\sqrt{x+2} - 5$

31.  $f(x) = \sqrt[3]{27x}$

32.  $f(x) = -2|x-4|$

**Describe a basic parent function and a sequence of transformations that can be used to produce a graph of the given function.**

33.  $f(x) = -(x-4)^3 - 2$

34.  $f(x) = 3\sqrt{-x} + 5$

35.  $f(x) = -2(x-1)^2 + 5$

36.  $f(x) = (5x)^2 - 3$

**Write the equation for the new function that is obtained from the given transformations on the parent function.**

37.  $f(x) = \sqrt[3]{x}$  : a vertical stretch by a factor of 2, horizontal shift left 3.

38.  $f(x) = |x|$  : a shift left 2 units, then a vertical stretch by a factor of 3, then a shift up 4 units.

**Divide using long division.**

39.  $\frac{x^2 - 2x - 30}{x + 5}$

**Solve.**

40.  $5x - 8 = -x - 4$